Sport for Individuals With Disabilities: Research Opportunities

Karen P. DePauw
Washington State University

Societal factors have not only influenced the sport-for-individuals-with-disabilities movement in general, but the research efforts as well. In addition to the effect of the legal mandates enacted in the 1970s (Education for All Handicapped Children Act, Rehabilitation Act, Amateur Sport Act of 1978), the sport for the disabled movement has been influenced by changes in the Olympic, youth, and women’s sports movements. In addition, the trends and issues facing international sport for athletes with disabilities can influence sport for individuals with disabilities in the United States.

Although a few studies had been conducted, it wasn’t until the 1970s and 1980s that a concerted research effort was directed toward athletes with disabilities. Recognizing this trend, the USOC’s Committee on Sports for the Disabled established a Subcommittee on Research (DePauw, 1986). As an initial step toward enhancing knowledge and understanding of disabled sport, a Disabled Sport Resource Clearinghouse (DSRC) was established under the guidance of the Research Subcommittee. In this Clearinghouse are directories of individuals who are conducting sport research, as well as bibliographic information on research on sport for individuals with disabilities. In addition, this subcommittee identified seven areas of research common to athletes with disabilities. Through the assistance of disabled athletes, professionals, and coaches of disabled sport, the research areas were verified and specific topics were suggested. The following is a list of the areas of research (the reader is referred to DePauw [1986] for complete discussion of these areas):

1. Effects of training and/or competition;
2. Selection and training of coaches, volunteers, officials;
3. Technological advances in sport research;
4. Sociological/psychological aspects of sport;
5. Differences/similarities among disabled and able-bodied athletes;
6. Demographics of sport for the disabled; and
7. Legal, philosophical, and historical bases for sport.

Request reprints from Dr. Karen P. DePauw, Department of Physical Education, Sport & Leisure Studies, Washington State University, Pullman, WA 99164-1410.
Trends in Disabled Sport Research

Although descriptive reports on sport for the disabled can be found in the literature before the 1970s, research reports are a much more recent occurrence. The research of the 1970s was conducted primarily in two general areas—exercise physiology and biomechanics—and the topics of these investigations were actually rather general and preliminary. Those interested in exercise physiology studied disabled athletes' level of conditioning and their response to exercise. Those interested in biomechanics studied wheelchair propulsion. The subjects for these investigations included wheelchair athletes, polio victims, and spinal-cord-injured individuals.

A substantial increase in research activity occurred during the 1980s; more studies were undertaken and the type of research became much more varied. The research investigations can be categorized under the following headlines: exercise physiology, biomechanics, classification systems, sport psychology, sport sociology, sport injuries, wheelchair design, effect of training programs/regimens, philosophy and future trends, and background of coaches. The subjects for these investigations were varied and included, among others, those who were wheelchair bound, cerebral palsied, blind, amputee, paraplegic, spinal-cord-injured, mentally retarded, or deaf. Studied were adults and youth, males and females. The research actually became sport specific; examples include road racing, weight lifting, sprinting, volleyball, basketball, javelin, and skiing.

Upon examination of the existing research literature, four trends emerge. Since the initial research endeavors, recent investigations have become (a) sport specific, (b) disability specific, (c) performance enhancing, and (d) discipline-oriented (e.g., sociology, exercise physiology).

Research Findings

Although it is inappropriate to generalize about the results of disabled sport research due to the individualistic and preliminary nature of such research, a synthesis and summation can provide at least the essence of what is known about sport for individuals with disabilities. The following statements can be made based upon what exists in the research literature. Because the following information is a summary, specific references are not cited but instead a comprehensive bibliography is attached.

1. Athletes with disabilities have been found to exhibit responses to exercise similar to those of able-bodied athletes. The differences found are related to differences in functional muscle mass and the extent of the physical impairment. Due to the identifiable physical differences, accurate measurements of physiological function have been difficult to obtain. A variety of graded exercise test protocols (wheelchair treadmill, arm crank, and wheelchair ergometry) have been devised. In utilizing the able-bodied model for physiological assessments, researchers must be careful when applying it to individuals with disabilities.

2. Both similarities and differences have been found when comparing the performance of able-bodied and disabled athletes through biomechanical analysis. It is expected that although the principles underlying the performance of motor skills do not vary, their applications differ due to identifiable physical
differences found in athletes with disabilities. There is little consensus in the literature.

3. More similarity than difference was found between disabled and able-bodied athletes on psychological factors. The iceberg profile (below average tension, depression, anger, fatigue, and confusion; above average vigor) for wheelchair-bound and visually impaired athletes and measures of anxiety and response to failure/success by athletes with disabilities were also found to be similar to those of able-bodied athletes.

4. Sociological parameters of athletes with disabilities are just now being investigated. Whereas attitudes toward physical activity and sport participation were similar when compared to able-bodied athletes, movement purposes and sport socialization were varied.

5. As expected, the training profiles of athletes vary according to the sport, the athlete, and the level of competition. The training varies from seasonal to year-round and also varies in frequency, intensity, and duration. Training is reported as useful for enhancing athletic performance of athletes with disabilities. Improvements in muscular strength, power, endurance, maximal oxygen consumption, flexibility, and body consumption have all been noted as a result of training programs.

6. Injuries to athletes with disabilities are reported to be similar to those found with able-bodied athletes. In addition, disabled athletes will have injuries specifically related to their disability (e.g., more blisters and soft tissue injuries with wheelchair athletes, leg and knee injury due to use of outriggers during skiing). Proper coaching, maintenance of equipment, proper officiating, and good health supervision can help prevent injuries.

7. The issues of classification, eligibility, and rules adaptation are complex and somewhat controversial. There has been little systematic investigation to provide a scientific basis for decision making.

Most of these studies have utilized a small number of subjects; some of the findings are based upon case studies. The subjects in these investigations are also quite diverse because of the nature of the individuals studied. The above-mentioned findings must be interpreted in the context of the given investigation. These limitations should not detract from the value of such data, but generalizations to other disability groups, sport, and/or conditions should not be made. These data will provide the foundation upon which further research can be based.

**Research Directions**

Sport research on individuals with disabilities is yet in its infancy. In any research effort, certain questions are asked in the search for truth. In general terms, these questions are Who? What? How? Why? What if? These questions have been asked and partially answered by research on sport for individuals with disabilities. Who and what were first asked in the 1970s. Although it remains important to know the who and the what, that basic knowledge fostered such questions as how and why in the early 1980s. Those questions are still being asked and will continue to be asked. The question of what if is just now being asked and has yet to be fully answered.

In the effort to answer these questions, the research on sport for individuals with disabilities should be focused in the following five areas: (a) movement efficiency—research on the mechanics and physiology of movement including
Research Opportunities

wheelchair design and adapted sport equipment; (b) sport performance—research on the effectiveness of training regimens and coaching techniques, application of sound principles of sport physiology, biomechanics, psychology, and nutrition for enhancing performance and injury prevention; (c) sport initiation—research on the reasons for and extent of participation in sport, effect upon participation in youth sport programs, recreation, and leisure activities; (d) effects of sport—research on the values of and specific sociological, psychological, and physical benefits of participation and competition upon functional capacity for sport and activities of daily living; and (e) influences upon sport—research on the historical, philosophical, legal, and societal factors influencing sport and athletes with disabilities.

The technology, methodology, and subjects required to answer research questions related to sport for individuals with disabilities do exist. Current knowledge and principles of engineering, physics, physiology, mechanics, materials, education/training, computer technology, rehabilitation, sport, and exercise are sufficient for addressing their unique application to sport performance of athletes with disabilities.

To adequately address specific research questions, the following are needed: (a) Team research effort—Teams of individuals should work together to answer specific research questions. These teams should include researchers from several disciplines (e.g., engineering, physiology, exercise, sociology, sport psychology, adapted physical education), practitioners, and individuals with disabilities; (b) Interagency cooperation—Research efforts could be coordinated with those specific agencies involved in disabled sport including the U.S. Olympic Committee (Sports Medicine Division), the national governing bodies (NGBs), national sport organizations serving individuals with disabilities, and other agencies for rehabilitation and/or sports medicine; (c) Computer simulation/mathematical modeling—Research efforts could utilize computer simulation and/or mathematical modeling techniques for investigating the factors underlying sport performance and their interactive effect upon performance; and (d) Information link—These include means whereby a database for research could be established for data collection and analysis, and a clearinghouse could be established or linked with existing USOC disabled sport research clearinghouses for sharing information with professionals, consumers, and the public.

Concluding Comments

So what does this all mean? It means that professionals in physical education and sport for individuals with disabilities who conduct research must (a) continue to ask these and other critical questions; (b) communicate and work with experts in related disciplines including, but not limited to, physiology, medicine, biomechanics, psychology, sociology, rehabilitation; (c) work in collaboration with sport organizations serving individuals with disabilities and athletes with disabilities, and (d) investigate expected performance based upon the application of the scientific principles to individuals with disabilities.

The research opportunities on sport for individuals with disabilities are many and varied. Sport and its participants can and should be studied. In the pursuit of knowledge and understanding of sport for individuals with disabilities, researchers must continually seek answers to critical questions and thereby give meaning and application to the findings.
References


Krebs, P., Otto, R., Perez, R., Smith, T., & Trimarchi, K. State of the art physiological assessments of elite amputee, CP and LA athletes. (Abstract)


